SUBCORTICAL CEREBRAL GUMMA ACCURATELY LOCALIZED IN THE COMATOSE STATE; DEATH; AUTOPSY.*

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The subject of brain tumor and the localization has long been a favorite one, not to say a "hobby of the neurologist," and the accurate finding and removal of tumor a dream which our forefathers, of not very long ago, had never had, and an accomplishment which is justly a pride to the modern physician.

That a tumor may develop to considerable size, particularly in the subcortex, underlying the motor area, and that it may exert pressure from below upon the cortex without seriously inconveniencing the individual or making itself manifest to the casual observer, does not seem to be fully appreciated. Indeed, few would be content to make a diagnosis of tumor of the brain without a majority of those so-called classic symptoms, vertigo, cerebral nausea and vomiting, headache, paralysis or paresis, sensory disturbance and optic neuritis.

Yet cases do occur, and not infrequently, in which there has been for a long time only an occasional headache, slight attacks of vomiting associated with numb and tingling sensations, which are looked upon as neurasthenic or hysterical. Mills, in 1900, in a report of a case of this kind, states in this regard: "It cannot be doubted that much in the history of the case and many of the symptoms pointed to the diagnosis of grave hysteria. Among these symptoms were unilateral hyperesthesia to touch, pain and temperature; persistent contraction of the fields for form and color, irregular color reversals, and frequently recurring states of emotional depression and excitement. When these were added to the fact that the ataxia and paresis vacillated considerably until a late period before the operation, and that the optic neuritis and the other general symptoms of brain tumor were absent or subordinate, it will be seen that many reasons existed either for the diagnosis of hysteria or for holding in balance the diagnosis between organic and functional disease." The tumor referred to was an endothelioma, subcortical, in the superior parietal convolution and was successfully removed by Dr. Keen. The patient had suffered from nervous symptoms for from eight to ten years.

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*Read at the meeting of the Colorado State Medical Society, Colorado Springs, Col., Oct. 2, 3, 4 and 5, 1905.

So also with the case I have the pleasure of reporting. After reviewing the clinical notes and the meagre history obtainable only through the relatives on account of the profound coma which had supervened when first observed, the attempt will be made to show that she had probably been afflicted with an intracranial growth for some time, if not from childhood.

E. A., a woman of thirty-three, single, was first seen May 12, 1905. She was born in Illinois and had been in Colorado some ten or twelve years, and of late had been occupied as a waitress.

Family history: Mother living, in good health. Father died of typhoid, and five sisters are dead from the following causes: some infantile disease, accident, confinement, accidental poisoning and septicemia. Chronic diseases, including tuberculosis, tumor, cancer, kidney, heart and nervous and mental diseases, are denied, as is also any knowledge of acquired syphilis and gonorrhea.

Previous history: As a child, had scarlet fever at thirteen, measles as an adult, and is stated to have been well until nine years ago, when she had mountain fever. Menstruated first at seventeen with considerable difficulty, and has been irregular ever since. She has always had severe headaches since childhood, at the height of which she would vomit, becoming nauseated at the time. Last summer she complained of her right leg and arm becoming weak and numb, and is known to have often had attacks of this kind.

Her sister states that she had for some time remarked that she could not see objects from the outer side of her right eye; that anyone coming up behind her and passing on the right side could not be seen without turning the head.

Present attack: On the morning of May 6 the right leg became very rigid and the arm limp, and in this condition she went about the house attending to her duties for the following four hours, during which time she became unable to speak. The last intelligible speech was "I can't talk," on the first day. She vomited a good deal on the 8th, and while she ate considerable since, including a hard boiled egg, she has up to the present vomited very little. From this time she became drowsy, and this drowsiness increased very gradually. On May 10 she dressed herself and went to the train to come to this city (Denver). The right leg is stated to have been very rigid, and the arm alternately rigid and flaccid. The left side was not noticed to have been affected, though the mouth was observed to be drawn to one side, supposedly to the left, although this is uncertain. The drowsiness deepened while she was en route, and she was quite comatose when her destination was reached. She was seen a few hours after her arrival, when the following notes were taken:

She lies in bed unable to be roused, with the mouth slightly drawn to the left side. The musculature of the right half of the body is in a state of tonic contraction, which is more particularly noticeable on attempting passive motion. The same is true of the left side, but not nearly to the same degree. Owing to the fixation of the face and jaw muscles, the tongue cannot be seen; there is, however, no "grinding" of the teeth. The abdomen is decidedly scaphoid. The skin is moist and warm to the hand, and there is no perceptible difference on the two sides. The temperature per axilla is 100 2-5, and is from 1-5 to 2-5 higher on the right side. Pulse 60 and regular, though compressible.

The breathing is for the most part costal, up and down in character, but at times Cheyne-Stokes.

She moves all four extremities, those of the left side more than those of the right. Pricking the limbs is followed by motion, which is noticeably delayed on the right side.

The eyes are partly open and the lids seemingly paretic; there is no response on touching the conjunctivæ. The eyeballs are almost fixed, and the left is rotated outward. The right pupil is 2½ mm. and the left 3½ mm. in diameter, and are little, if at all, influenced by light.

The urine and feces are passed involuntarily.

Reflexes: Knee-jerks, R. decidedly increased; L. same, and seemingly more than the right, and there is a slight attempt at a clonus of the extensors on tapping the patellar tendon. Tapping the shaft of either tibia is followed by a decided extension of the leg. Both feet are in a constant position of equino-varus, with hyperextension of the toes. The deep reflexes of the forearm are markedly increased on both sides, but are very difficult to elicit on account of the rigidity induced in response to the slightest touch. Tapping the styloid process of the radius is promptly followed by active flexion in each arm. The pectoral and deltoid muscles respond actively and equally on the two sides.

Superficial reflexes: Plantar, R. present, and on stroking the sole of the foot there is a marked extension of the great toe, accompanied by a very slight extension of the small toes and with some separation. There is no perceptible difference on the left side. On tapping the dorsum of the foot there is to be seen only an attempt at extension of the second toe.

Lower abdominal, R. absent, L. same, and the epigastric reflex is absent.

Eyes: As before stated, there is apparently ptosis, bilateral, and the conjunctivæ are irritated from exposure. The eyes are fixed and no nystagmoid movement is to be seen. The left eye is rotated outward, and apparently to the extent of 5 to 6 mm. Neither pupil responds to light. The left disc cannot be outlined, is hazy in appearance, and the vessels are very turgid and tortuous, though the swelling is seemingly slight. The right is still more difficult to see, owing to the smaller pupil, and what could be made out of the fundus, especially the tortuosity of the vessels and the hyperemia, was very much the same as in the left eye. Under the slight effect of cocain upon the pupil, the left disc might be said to suggest atrophy in its left half, while the nasal side is unquestionably more hyperemic and the outline certainly not so well defined.

May. 13. The breathing is decidedly more tranquil, and the up and down character has disappeared.

May 15. The muscles are relaxed and only become tense upon passive motion. The diaphragm is now used in breathing. The eyelids are noted to have been moved. She is made to swallow, with difficulty, butter with croton oil, which is later followed by several bowel movements.

May 16. There is a decided improvement in the general condition. Beef juice and other liquids placed upon the tongue are swallowed. There are no spasticities while at rest. There is frequently movement of the eyelids. The abdomen is more decidedly scaphoid.. No rigidity of the neck muscles can be felt. The mouth can only occasionally be forced open, when the tongue can be made to respond to stimulation as before mentioned by placing liquids thereon. There is seemingly more motion on the right than on the left side of the face. She lies quietly, breathing easily, and with little or no motion of the hands, though the feet are occasionally drawn upward. When placed on her side the upper limb is the one moved. She coughs occasionally, as if attempting to clear the throat. The lung and heart sounds are clear, and no edema is to be observed in any part of the body.

No change in her condition is recorded from this time until her death May 17, at 3 p.m., except a gradual weakening of the pulse, a few slight spasms or twitchings and the rise in temperature, the last reaching 105 per axilla at death.

Clinical diagnosis: Gumma, of long standing, situated in the corona radiata immediately above the insula and below the arm area in the cortex, with secondary softening, with a basal meningitis and probably with multiple recent plaques or gummatous inflammation at the base.

This diagnosis seemed to best coincide with the following facts: Headache, the importance or significance of which, however, was lessened from the fact that it had existed since childhood, and that recent attacks were no more severe than those experienced before. When, however, it was learned, after the arrival of the mother, that the father had had a skin disease for which he went to Hot Springs prior to the birth of the children, much more weight could be attached to the presence of this symptom. The history of weakness and twitchings in the right arm, and what was undoubtedly a right homonymous hemianopsia, certainly pointed to mischief in the left hemisphere, and this was strengthened when the motor aphasia, comparatively slow in onset, had supervened, inasmuch as she was known to have been right-handed. The gradual onset of the coma accompanied by rigidity, would suggest either the corpus callosum or the ventricle, while the slight rigidity of the posterior neck muscles, and the fact that it disappeared under mercurial treatment together with the ocular deviation, led to the suspicion of a basal meningitis of syphilitic origin.

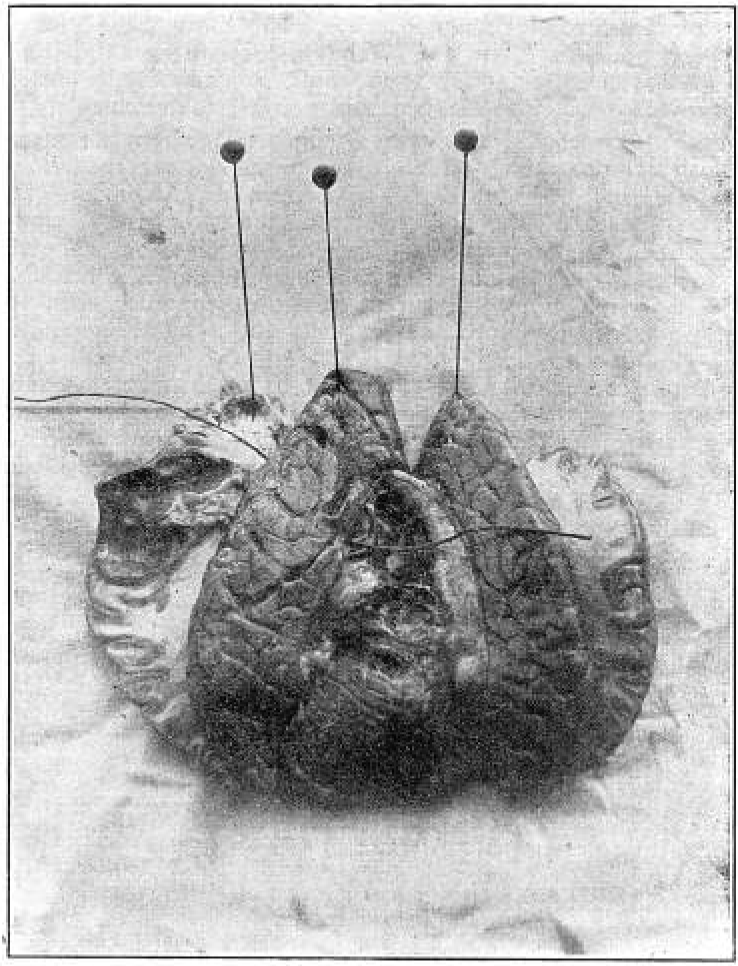
Autopsy: Unfortunately, consent to a post-mortem examination could not be obtained until three days after death. Mention will be made only of those points bearing upon the localization and the character of the tumor, and the evidence of the subsequent softening.

Upon opening the calvarium the membranes were found to be not adherent.

A marked depression was to be seen within the motor area, which measured about 7 to 8 centimeters in diameter. Anteroposteriorly, the greatest diameter lies between the second frontal convolution in front and the superior parietal behind. On the mesial surface the cortex is depressed at about the paracentral lobule. The membranes were not adherent over these areas, and the cortex shows no difference to the naked eye when compared with the opposite side. The basal ganglia and the vessels at the base are bathed in a yellowish white exudate, gelatinous in consistence, and there are numerous adhesions to be seen. After separating the two hemispheres, the right ventricle was opened through the corpus callosum and found to contain an opaque yellowish fluid, while the left was filled with a heavy, green and extremely offensive pus. An incision was next made through the left hemisphere parallel to the superior longitudinal sinus and through the greatest diameter of the depression, which disclosed an abscess cavity, the base and sides of which presented a hard, cartilage-like border. The roof, or cortex, was soft and about 3 mm. in thickness. The indurated wall was from 3 to 6 mm. in thickness, and showed numerous small blood vessels filled with blood clots.

The cavity communicated with the lateral ventricle by means of an opening which was large enough to admit the tip of one's little finger, and seemed to perforate under the corpus callosum.

From what has been said in this brief résumé of the autopsy there can be but little doubt as to the character of the growth, and when to this is added the diffuse gummatous meningo-encephalitis which appears as a gelatinous mass, likened by Oppenheim to collodion, and which, according to Huebner, "often



Gumma, Subcortical, Showing the Depression on the Mesial Surface at the Paracentral Lobule and the Cord Passing Through the Rupture Into the Lateral Ventricle.

disappears under treatment leaving a fibrous cicatrix which resembles chronic pachymeningitis," the doubt becomes slight.

A very pertinent question at this time is "How long has this growth existed?" Upon this we can but speculate, though it would seem that with the probability of congenital syphilis, the attacks of headache and vomiting dating back to childhood, its inception at this time can justly be suspicioned, which is in turn strengthened by the evidence of the sister with reference to the blindness of the right field.

Deserving of mention is a peculiar feature of the coma presented by this case. In attempting to rouse the patient by calling, shaking or by motion sufficiently active to awaken a conscious person an entirely different phase was excited; movement of the limbs, rigidity to passive motion, change in the character of breathing, sometimes accompanied by an audible voice sound with expiration, and acceleration of the pulse would be induced, while if left alone the rigidity would relax, except in the feet; the motion ceasing, she would pass into a quiet, tranquil sleep. If then the arm were cautiously elevated and released it would drop to the side, and if this was repeated a sufficient number of times she could again be awakened, as it were, for it seemed to the observer to admit of the paradoxical expression "a sleeping and a wakened state of the unconscious." While at present, to my knowledge, no importance can be attached to this phenomenon, yet it was so striking, and may later prove an aid in the study of the comatose states, if not in localization, that one cannot refrain from mentioning it at this time, and particularly since the peculiarities of sleep in cases of cerebral tumor have been recently studied by Franceschi, in which the nature and causes of what he terms pathological sleep are taken up. He describes the appearance of a continuous and tranquil sleep, though he makes no mention of the changes which have been noted above in attempting to arouse the sleeper. It may be that the explanation offered by him will apply to this case; assuming as most reasonable that sleep is produced by anemia of the cerebral cortex, this is taken to coincide with the fact that pathological sleep is most frequently observed in tumors of the optic thalami, hypophysis and the floor of the third ventricle, and as such, interfere with the circulation of the brain by pressure upon the circle of Willis.

Since it is the purpose of this report to show that tumors, and especially syphilitic gummata, may exist for a long time in certain localities of the brain, and probably lie dormant to suddenly become active by increase in size, or, as in this case, soften, suppurate and rupture with the irremedial result, and which prior to the time of activity give but little evidence of its presence, there is but little to add in conclusion.

While the early or rapid diagnosis of cerebral tumor is often of great moment, yet conservatism is the better course even in those considered operable, though for want of reasonable certainty, lives should not be jeopardized by operative interference; on the other hand, the diagnosis of neurasthenia should be made with extreme caution, if at all, in the presence of a single organic brain symptom.